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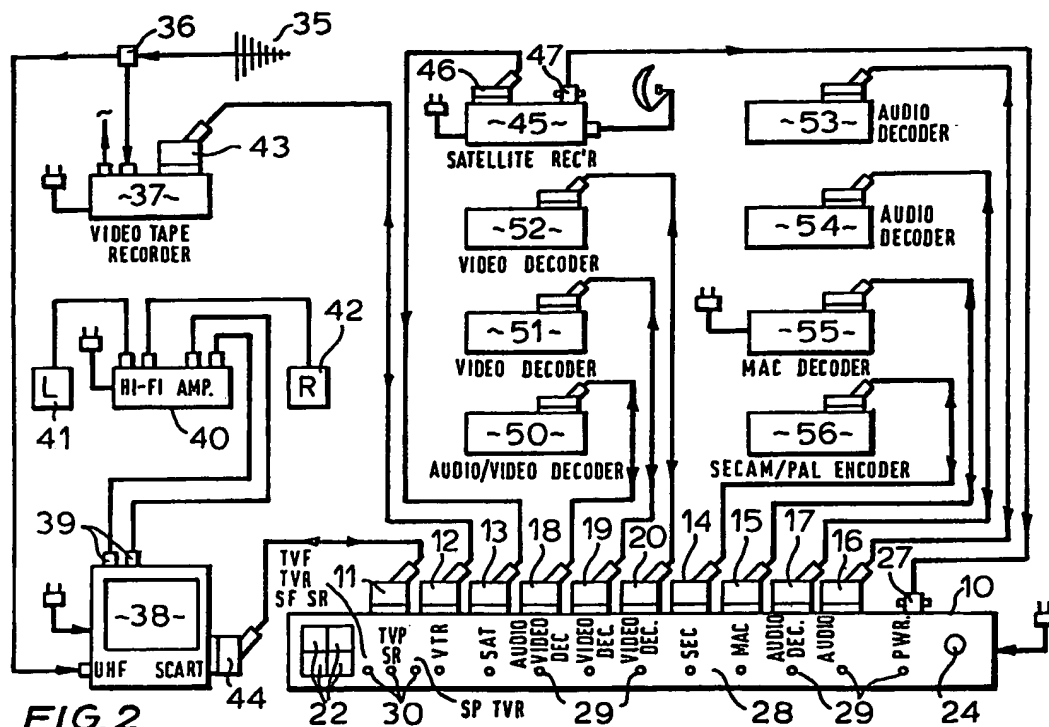
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## (54) Audio and video switching apparatus

(57) Switching apparatus links together a plurality of audio and/video components (Figure 2), each of which is fitted with a SCART socket interface, and has a housing 10 provided with at least three, but typically ten SCART sockets 11 to 20, for connection to the various components. The housing further includes a socket 27 for baseband composite video signals derived typically from a satellite receiver 45 which socket is linked within the housing to a pin of at least one of the SCART sockets of the housing, to allow distribution of the baseband signal to an appropriate decoder. The apparatus has an array of solid-state switches (21, Figure 1) interconnecting the various audio and signal pins of the SCART sockets and a control arrangement for that array of switches, respective lights 29 indicating which sockets are in use. The controller may be operated by an infra-red remote control.

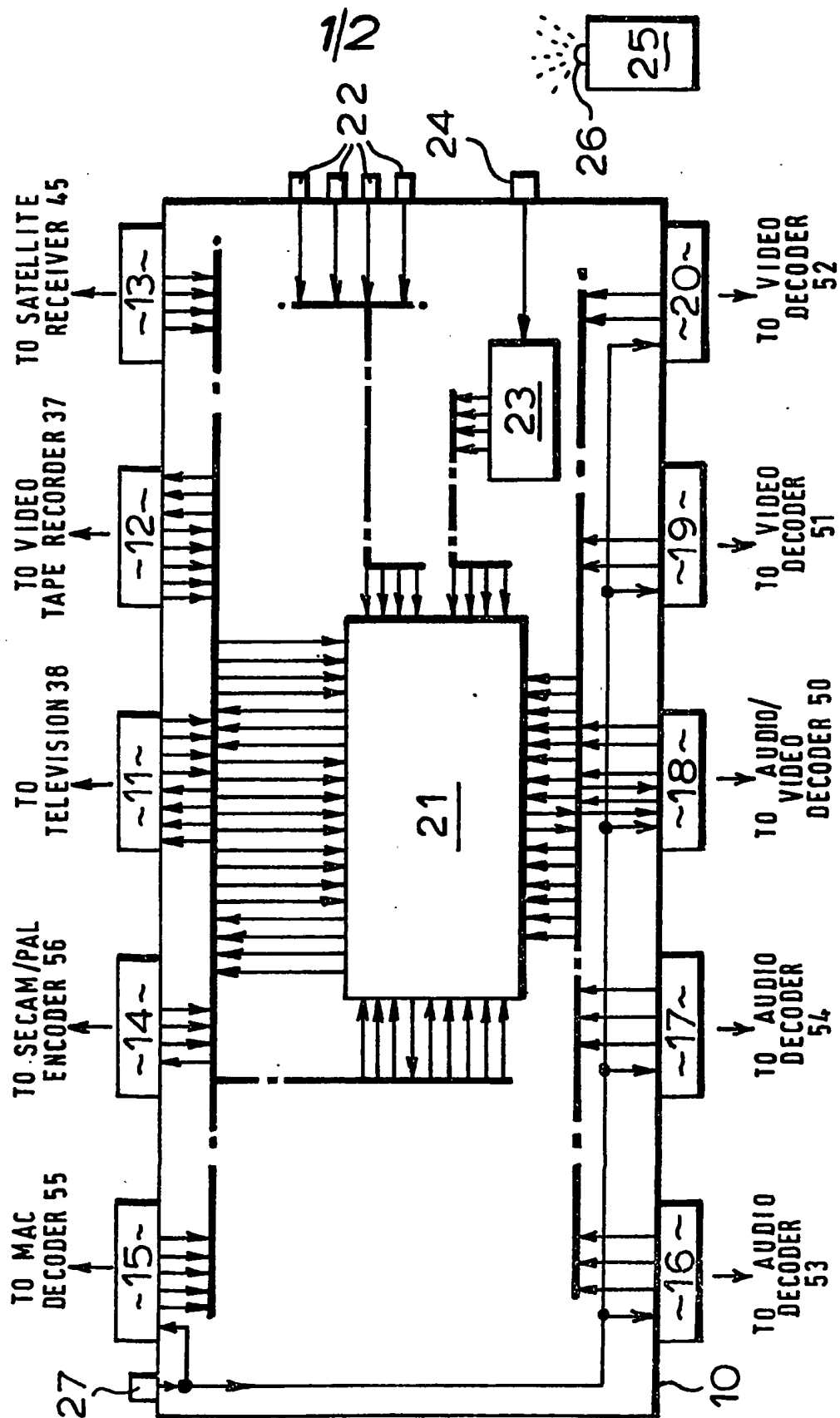


At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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FIG. 1



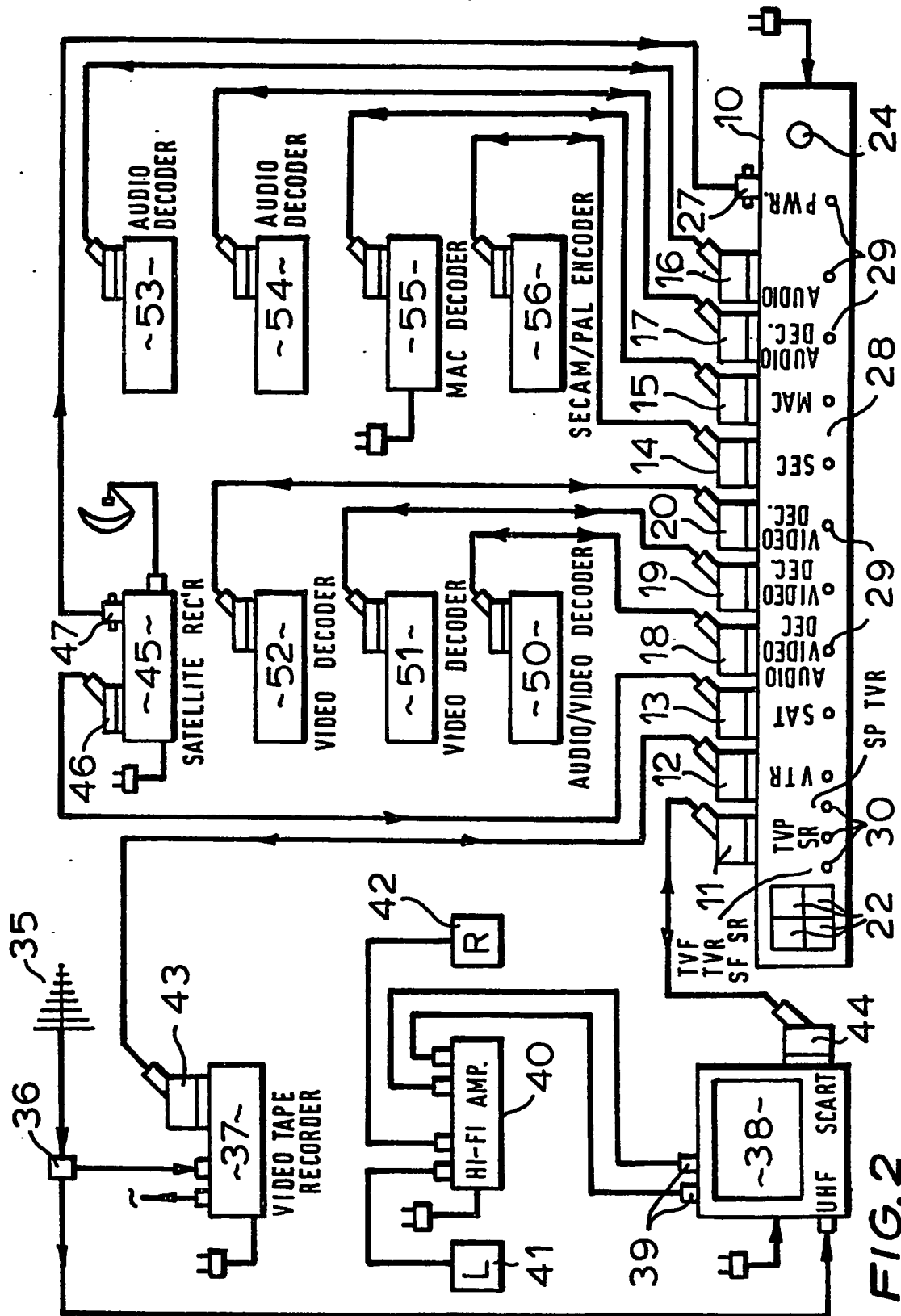


FIG. 2

**AUDIO AND VIDEO SWITCHING APPARATUS**

This invention relates to apparatus for linking together a plurality of audio and/or video components.

In the modern domestic environment, there are now to be found many separate items of relatively high technology audio and video equipment. Very often, these items need to be coupled together in order to function properly and to the optimum performance. To this end, it is now the usual practice of the manufacturers of such equipment to fit to their equipment one or more sockets meeting an international standard designed for the interconnection of domestic audio and video equipment. The interconnection of a video recorder with a television receiver using these sockets is relatively simple and requires only one cable with the appropriate plugs. However, with the advent of satellite receivers together with special decoders to suit various needs - such as the reception of "scrambled" video/audio signals - a user often is unable to keep the equipment permanently interconnected with cables since this does not give the user interconnection options he may require. Most users are not prepared to keep changing the plugs around, and so the recommended solution to the problem is to provide a UHF aerial loop, and to link all of the items of equipment via their UHF sockets. However, the results of doing this tend to be very poor, resulting in low-

quality definition television pictures, low quality recording, cross-modulation with noise bars on video signals, and so on.

Most audio and video equipment is these days  
5 fitted with a socket conforming to the audio-visual interface standard developed by the European Committee for Electro Technical Standardisation (CENELEC) and is defined by European Standard EN 50 049, as well as in the corresponding British Standard BS 6552. This  
10 interface is referred to in these Standards as the Peritelevision Audio-Visual Interface Standard and the standardised plug-and-socket connector utilising the Peritelevision Standard is commonly referred to as a SCART connector, having a SCART socket and SCART plug,  
15 as appropriate. The term SCART will hereinafter be used to refer to an audio-visual interface connector conforming to the Peritelevision Standard.

A standard SCART connector conventionally has a socket mounted on an item of equipment, and a plug  
20 which may be mated with that socket is provided on an interconnecting cable. Connection between the socket and the plug is through a staggered two row by ten contact arrangement, plus an extra contact making connection to an outer shield; in this way a total of  
25 21 connections are provided. Included amongst these 21 connections are inputs and outputs for two audio channels (usually stereo left and stereo right), video

frequency inputs and outputs, separate red, green and  
blue video connections, function (slow) switching and  
blanking (fast) switching connections, two data  
communication connections and various ground  
5 connections.

In an attempt to solve the difficulty of  
interconnecting various pieces of high-complexity  
equipment, it has been proposed to use a switch-box  
including a number of multi-way sockets and a  
10 mechanical switch arranged to interconnect any two or  
more of those sockets to a common bus within the  
switch-box. However, mechanical switches tend to be  
unreliable and electrically noisy, if used at the  
frequencies encountered in a SCART connector. Such a  
15 switch-box would in any event be insufficiently  
flexible to permit the connection of a satellite  
receiver for example to a decoder which requires a  
composite video or baseband signal.

It is a principal aim of the present invention to  
20 provide switching apparatus suitable for linking  
together a plurality of separate audio and/or video  
components in such a way that an appropriate  
interconnection of the components may be achieved  
without the need to effect any mechanical switching  
25 therebetween, or to perform disconnection and re-  
connection of the plugs and sockets associated with  
those components.

According to the present invention, there is provided switching apparatus for linking together a plurality of audio and/or video components each of which is fitted with a SCART socket (as defined  
5 herein), which switching apparatus comprises a housing provided with at least three SCART sockets, a baseband composite video signal input socket which socket is linked to a pin of at least one of the SCART sockets, an array of solid-state switches interconnecting the  
10 various audio and video signal pins of the SCART sockets, and selection means to permit selection of which SCART sockets are to be interconnected and to operate the solid-state switches of said array depending thereupon, so as thereby to link together the  
15 respective pins of the selected sockets.

The term "baseband composite video signal" is used herein to refer to a signal derived, for example, from a satellite receiver and which requires decoding in some way in order to obtain a useful signal suitably  
20 for directly driving a conventional television receiver, a video recorder or the like. Such a baseband signal may be clamped or unclamped, and may have or be without emphasis or de-emphasis; the baseband signal must be suitable for feeding to the  
25 appropriate decoder, having regard to the encoding system in use for a given channel. Current satellite receivers permit the selection of appropriate

characteristics for the baseband signal output by the receiver, on a channel-by-channel basis. In this way, the precise nature of the baseband signal may vary from channel to channel, and the decoder to which it is fed  
5 will similarly be selected for proper decoding of the baseband signal.

In order to impart to the apparatus of this invention sufficient flexibility to be able to accommodate a number of different audio and/or video  
10 components, it is preferred for there to be provided a first SCART socket intended for connection to a television receiver, a second SCART socket intended for connection to a video recorder or cam-corder, a third SCART socket intended for connection to a satellite  
15 receiver or cable television receiver, and at least one further SCART socket - but preferably two or even more than two further SCART sockets - intended for connection to respective audio or video decoders, each such further SCART socket having a pin thereof directly  
20 linked to the composite high frequency video socket. In such a case, the baseband composite video signal input socket is intended to be linked direct to a satellite receiver which itself is connected by the Peritelevision interface to the third SCART socket,  
25 whereby when decoding of the baseband composite video signal is required, this may be achieved via the signal supplied to the composite high frequency video input



socket, with that signal being fed to the appropriate decoder through the SCART socket to which that decoder is coupled.

5 It will be appreciated that at least one of the further SCART socket pins must be dedicated to the baseband composite video signal, instead of its assigned use according to the Peritelevision Standard. However, for a video and/or audio decoder, not all of the 21 pins will be required; for example, the function  
10 (slow) switching pin 8 may be employed for this purpose, or one of the data communication lines (pins 10 and 12) may be employed. Of course, the switching apparatus of this invention should employ a consistent "local" standard, for this signal pin.

15 In addition to the SCART socket identified above, the apparatus of this invention may include yet another SCART socket intended for connection to an encoder able to convert a video signal of one standard (for example, SECAM) to a signal of another standard (for example,  
20 PAL).

It is preferred for the apparatus to be provided with a receiver for an infra-red remote control transmitter, the output of which receiver is connected to the solid state-switch array to control the  
25 operation of the switches thereof. In this way, a selection of the required interconnections between the various SCART sockets may be controlled remotely, by

use of the infra-red remote control transmitter. However for certain record/viewing modes, it is convenient also to provide the housing with manually operable switches, which themselves control the  
5 operation of the solid state-switch array.

To make the apparatus more easy for a user to operate, it is preferred for the housing to include a front panel on which is provided a plurality of indicator lights, which lights are selectively  
10 illuminated to show the operational state of the apparatus. Conveniently, there is provided one indicator light for each of the SCART sockets except for the television receiver SCART socket, and for each indicator light to be illuminated when its associated  
15 SCART socket has been selected.

It is also preferred for the function (slow) switching line 8 of the Peritelevision Standard to be employed to control the operation of the solid-state switching array, whereby when a component of equipment  
20 is activated, automatically the switching array operates to link in its audio and video pins to other selected sockets. For example, when the switching apparatus is connected to a video recorder, using the respective SCART sockets of the switching apparatus and  
25 of the recorder, activating the video recorder will pull pin 8 of its SCART socket high. The switching apparatus should be arranged to detect this, and then

cause the solid-state switching array to connect into the other active SCART sockets the audio and video pins of the video recorder SCART socket. Similarly, operating a video decoder (for example, a Sky-Movies  
5 decoder) should automatically be detected by the switching apparatus of this invention whereby the composite signal, after decoding, will be fed back into the switching apparatus for distribution to the television receiver SCART socket, video recorder SCART  
10 socket and so on.

By way of example only, one specific embodiment of switching apparatus of this invention will now be described in detail, reference being made to the accompanying drawings, in which:-

15 Figure 1 is a block diagram of the embodiment of switching apparatus of this invention; and  
Figure 2 is a block diagram showing the interconnection of the switching apparatus of Figure 1 with various audio and video components.

20 The switching apparatus of this invention comprises a housing 10 which is fitted with ten SCART sockets 11 to 20, each of which is connected internally of the housing 10 to an array 21 of solid-state switches. The respective pins of each socket for video  
25 signals, left and right audio channels, red, green and blue colour signals and blanking signals are separately connected to the solid-state switches of array 21,

whereby all of those signal pins of one SCART socket may be connected through the array 21 to the corresponding signal pins of another SCART socket. Operation of the array 21 is controlled by manual  
5 record/play selector switches 22, and by the decoded output of a remote control receiver 23, having an infra-red sensor 24 mounted on the housing 10. A suitably encoded infra-red signal may be transmitted to the sensor 24 by a control handset 25 having an infra-  
10 red transmitter 26, in a manner well-known and understood in the art.

The housing 10 is also provided with a socket 27 for the input of a baseband composite video signal (C.V.) derived for example from a satellite receiver.  
15 This socket 27 is linked directly (that is to say, not via the array 21 of solid-state switches) to SCART sockets 15 to 20. Since the Peritelevision standard does not have a connector pin assigned to this use, one of the pins ordinarily used for other purposes must be  
20 re-assigned for this C.V. signal; with the present embodiment, the video signal out pin 19 may be employed for this purpose.

To assist a user in appreciating precisely which connections have been made within the switching  
25 apparatus, the front panel 28 is provided with a plurality of indicator lights 29, one associated with each switchable SCART socket respectively. Whenever

the pins of a SCART socket have actively been connected by the array 21 of switches, an appropriate signal is sent to the indicator light associated with that SCART socket, to illuminate the same and thus to indicate that the respective SCART socket is in use. The front panel also has a further series of three indicator lights 30, to show the connections for the possible recording and playback modes, selected for example by means of the switches 22.

Figure 2 shows how the switching apparatus is connected by means of the SCART sockets 11 to 20 to various audio and video components. As can be seen, a conventional UHF television aerial 35 is connected to a UHF splitter 36 from which the UHF signal is fed both to a video tape recorder 37 and a conventional television receiver 38. The television receiver has a pair of stereo audio sockets 39 which are connected to a high-fidelity amplifier 40 driving a pair of loud speakers 41 and 42.

Both the video tape recorder 37 and the television receiver 38 have respective SCART sockets 43 and 44, which are connected respectively to sockets 12 and 11 of the switching apparatus.

A satellite receiver 45 has a SCART socket 46 which is connected to SCART socket 13 of the switching apparatus, but also has a baseband composite video output BNC socket 47, which is connected to socket 27

of the switching apparatus.

Also shown in Figure 2 is an audio/video decoder 50 connected to SCART socket 18, first and second video decoders 51 and 52 connected respectively to SCART sockets 19 and 20, first and second audio decoders 5 connected respectively to SCART sockets 16 and 17, a MAC decoder 55 connected to SCART socket 15 and a SECAM/PAL encoder 56, connected to SCART socket 14.

It will be appreciated that the switching apparatus described above and illustrated in the drawings is able to perform the following switching functions:

1. Switches for video;
2. Switches red green blue signals for D. MAC video/B.S.B. receiver and SVHS video tape recorder;
3. Switches for stereo audio for recording and Hi-Fi system;
4. Facility to record and playback television;
5. Facility to record and playback satellite;
6. Facility to record television and watch satellite;
7. Facility to record satellite and watch television;
8. Facility to distribute television or satellite around a house retaining all decoding facilities;
9. Switches for SECAM encoder to obtain coloured television from French satellites;
10. Switches for stereo unit to obtain high quality satellite audio;

11. Switches for NICAM stereo unit to meet new satellite standards;
12. Switches for three video decoders to cover existing and future scrambling systems;
- 5 13. Visual indication of mode of operation of the switching apparatus; and
14. Power capacity sufficient to supply power to all of the low power decoders etc. plugged into the apparatus.

10       The solid-state switches of array 21 are all activated automatically on selection of the appropriate piece of equipment - that is, television receiver, satellite receiver, video tape recorder, first video decoder, second video decoder, first audio/video  
15 decoder, SECAM encoder, MAC decoder, first audio decoder, and second audio decoder. The selection of the playback and recording modes may be made by manual switching at the front of the apparatus, or by a hand-held remote controller, to give one of:

20

- a)           Television play/Television record or  
              Satellite play/Satellite record
- b)           Television play/Satellite record
- c)           Satellite play/Television record
- 25 d)           Remote SCART switching of satellite receivers not incorporating SCART socket switching.

With embodiment described above, it is necessary only for a user to select the remote control handset of particular unit required to be operated, and then to use that hand set; automatically the switching will be performed to pull that unit into the circuit. No  
5 tuning or adjustment of the switching apparatus is required at any time in order to achieve optimum results.



**CLAIMS**

1. Switching apparatus for linking together a plurality of audio and/or video components each of which is fitted with a SCART socket (also as defined herein), which switching apparatus comprises a housing provided with at least three SCART sockets, a baseband (also as defined herein) composite video signal input socket which socket is linked to a pin of at least one of the SCART sockets, an array of solid-state switches interconnecting the various audio and video signal pins of the SCART sockets, and selection means to permit selection of which SCART sockets are to be interconnected and to operate the solid-state switches of said array depending thereupon, so as thereby to link together the respective pins of the selected sockets.
2. Switching apparatus as claimed in Claim 1, wherein there is provided a first SCART socket intended for connection to a television receiver, a second SCART socket intended for connection to a video recorder or cam-corder, a third SCART socket intended for connection to a satellite receiver or cable television receiver, and at least one further SCART socket intended for connection to an audio or a video decoder, said further SCART socket having a pin thereof directly linked to the composite high frequency video socket.

3. Switching apparatus as claimed in Claim 2, wherein there is more than one further SCART socket intended for connection to a respective audio or video decoder.

5 4. Switching apparatus as claimed in Claim 2 or Claim 3, wherein at least one of the pins on the or each said further SCART socket is dedicated to carry a baseband composite video signal.

10 5. Switching apparatus as claimed in Claim 4, wherein at least one of pins 8,10 and 12 of each said further SCART socket is employed for carrying baseband composite video signals.

15 6. Switching apparatus as claimed in any of the preceding Claims, wherein there is provided yet another SCART socket intended for connection to an encoder adapted to convert a video signal of one standard to a signal of another standard.

20 7. Switching apparatus as claimed in any of the preceding Claims, wherein the apparatus is provided with a receiver for an infra-red remote control transmitter, the output of which receiver is connected to the solid state-switch array to control the operation of the switches thereof.

25 8. Switching apparatus as claimed in any of the preceding Claims, wherein the housing includes a front panel on which is provided a plurality of indicator lights, which lights are selectively illuminated to

show the operational state of the apparatus.

9. Switching apparatus as claimed in Claim 8, wherein there is provided one indicator light for each of the SCART sockets except for the SCART socket  
5 intended for connection to a television receiver, the indicator lights being arranged to be illuminated when its associated SCART socket has been selected.

10. Switching apparatus as claimed in any of the preceding Claims, wherein the function (slow) switching  
10 line 8 of the Peritelevision Standard connections is employed to control the operation of the solid-state switching array, whereby when a component of equipment is activated, automatically the switching array operates to link in its audio and video pins to other  
15 selected sockets.

11. Switching apparatus as claimed in Claim 1 and substantially as hereinbefore described, with reference to and as illustrated in the accompanying drawings.

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

- 17 -

Application number

GB 9209304.6

**Relevant Technical fields**

(i) UK Cl (Edition L ) H4F (FAA, FGG, FGH, FJF, FJX)  
G5R (RAB, RAC, RAD)

(ii) Int Cl (Edition 5 ) H04N (5/00, 5/262, 5/268,  
9/00);  
G11B (31/00)

**Search Examiner**

M J DIXON

**Databases (see over)**

(i) UK Patent Office

(ii) WPI ONLINE

**Date of Search**

28 JULY 1993

Documents considered relevant following a search in respect of claims ALL

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X,E	GB 2254512 A (HOOPWELL) 7 OCTOBER 1992 see for example Figures 5, 6	1-4
X	GB 2247375 A (TATUNG) see for example page lines 25-26	1-4
X	GB 2246048 A (FERGUSON) whole document	1-4, 7
X	FR 2583945 A (PARRIAUX) see especially Figures 3a, 3b	1-4, 8

Category	Identity of document and relevant passages	Relevant to claim(s)

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